

Antibiotic Profiles and Biofilm Formation in acne-causing bacteria, focusing on *Staphylococcus* sp.

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Structured Abstract

Background: Acne is a persistent, inflammatory skin condition that affects the pilosebaceous unit and causes lesions on the face, back, and chest. *Staphylococcus* species, particularly *Staphylococcus aureus*, play an important role in acne infections due to their ability to form biofilms, a virulence factor linked to antibiotic resistance. There is a lack of knowledge in Malaysia about the antibiotic profiles and biofilm-forming abilities of local *Staphylococcus* species that cause acne. This research attempts to fill that gap and provide insights into better treatment strategies.

Methods: Bacteria samples from acne pus were collected from individuals with acne using sterile swabs and cultured on Mannitol Salt Agar (MSA) and Brain Heart Infusion (BHI) agar. Gram staining, catalase, and coagulase tests were performed to identify presumptive *Staphylococcus* species. Antibiotic susceptibility was tested using gentamicin, erythromycin, clindamycin, tetracycline, and cefoxitin. Biofilm formation was evaluated using a crystal violet assay in 96-well microtiter plates. Molecular identification was conducted through 16S rRNA gene sequencing using PCR amplification, followed by BLAST analysis.

Results: A total of 15 bacterial isolates were obtained, of which 11 of them were identified as presumptive *Staphylococcus* species. Antibiotic profiling revealed that all isolates were sensitive to gentamicin, erythromycin, and clindamycin. However, six isolates were resistant to cefoxitin and classified as methicillin-resistant *Staphylococcus aureus* (MRSA). Biofilm testing demonstrated that isolates S4 and S7 produced moderate biofilm, S9 and S10 formed weak biofilm, while S2, S3, S5, S6, and S8 were non-biofilm producers. 16S rRNA sequencing successfully confirmed the bacterial identity.

Conclusion: In conclusion, this study highlights the antibiotic resistance and biofilm-forming ability of acne-causing *Staphylococcus* species. The prevalence of MRSA among the isolates underscores the need for improved treatment approaches. Findings from this study provide essential data for better management of acne infections caused by *Staphylococcus* species.

Keywords: Acne, *Staphylococcus aureus*, biofilm, antibiotic resistance, 16S rRNA sequencing

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